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plateau resources LIMITED

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December 12, 1984

Ms. Pamela Grubaugh-Littig
State of Utah
Dept. of Natural Resources
Division of Oil, Gas and Mining
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Re: Plateau Resources Limited
Reclamation Estimate

Dear Ms. Grubaugh-Littig:

Pursuant to our telephone conversation on December 7, 1984, the revised reclamation plan for the Shootaring Canyon Uranium Processing Facility is enclosed. You will note that the revisions are for the most part minor and will not affect the reclamation cost estimates.

The revised plan has been submitted to the NRC as part of Plateau's license renewal application. I will advise you if the NRC requires any further revisions to the plan.

Please feel free to call if you have any questions.

Very truly yours,

Fred Gerdeman

FG/sbp

Enc. A/S

cc: Jay D. Gurmankin

SHOOTARING CANYON URANIUM PROCESSING FACILITY

Garfield County, Utah

MILLSITE DECONTAMINATION AND RECLAMATION

Plateau Resources Limited

December 1984

MILL SITE DECONTAMINATION AND RECLAMATION

Introduction

This plan amends the NRC-approved "Decommissioning and Reclamation Plan, January 7, 1982" and incorporates changes to 10 CFR Part 40 resulting from EPA's issuance of 40 CFR Part 192 (Federal Register, October 7, 1983).

Decommissioning

Decommissioning of the processing facility will entail dismantling, decontaminating, and disposing of buildings, foundations, contaminated equipment, and excavating contaminated areas as necessary to permit unrestricted use of the site. The last cells of the tailings storage area will be capped and stabilized. The tailing cells will be progressively covered during the operating life of the processing facility, and an estimated 6.25 acres will require capping with clay, sand, and gravel at the time of final decommissioning. When decommissioning is completed, the site will be reclaimed.

DISMANTLING, DECONTAMINATION, DISPOSAL

Salvageable equipment and buildings will be dismantled and decontaminated to the maximum allowable surface contamination levels specified in Table 5.5-6 prior to release to unrestricted areas. Sandblasting, scrubbing with detergents, high-pressure water and other methods of physical decontamination will be adopted as prescribed by the ERHS. Concrete floors, foundations, sumps, subsurface piping or other materials with surface contamination levels exceeding the Table 5.5-6 values will be broken up, removed, and buried in the

tailings area. Contaminated earth, such as may be found beneath the foundations and ore stockpile pads, where the average Ra-226 contamination in land, averaged over areas of 100 m^2, which, as a result of uranium byproduct material, does not exceed the background level by more than 5 pCi/g averaged over the first 15 cm below the surface, and 15 pCi/g, averaged over 15 cm thick layers more than 15 cm below the surface, will be excavated and taken to the tailings area for disposal.

Equipment and buildings (especially those constructed of bolted prefabricated steel construction) that meet the NRC surface radiation standards at the time of decommissioning may be sold or reused elsewhere.

The security fence constructed around the tailings impoundment area will be maintained throughout the operating life of the project. This fence may be left in place.

POSTOPERATIONAL MONITORING PROGRAM

Monitoring and decontamination during decommissioning will be supervised by the ERHS. Supervisory and industrial safety requirements will be enforced and the needed protective equipment provided. The radiological survey conducted after cessation of milling will involve making direct and indirect measurements of surface contamination. Surface and sub-surface soil profile sampling will be done in combination with gamma-dose rate measurements at the site to demonstrate compliance with land cleanup requirements stated above.

Reclamation

The purpose of this reclamation program is to restore lands disturbed by project activities (except for the tailings impoundment) to a productive condition consistent with past and present uses of the area. This consists of restoring landscape contours to slopes similar to predisturbance conditions and, in some instances, replacing a sufficient thickness of topsoil to enable native vegetation to become reestablished.

Several characteristics of the project area, and southern Utah in general, are considered nonconducive to the rapid establishment of native plant species on disturbed areas. The low average annual precipitation of 6 to 8 inches (15-20cm); frequent droughts; extreme temperatures; high wind erosion; and a loose, undifferentiated soil profile with poor moisture-holding capacity and little organic content are a few of those characteristics.

Based on the types of disturbances anticipated, the environmental characteristics of the area, the present and proposed land uses, and the state-of-the-art knowledge on reclamation in arid environments, reclamation of areas disturbed by the project will include:

(a) Covering and stabilizing the tailings impoundment area;

(b) Removing structures and regrading disturbed areas to blend with the surroundings;

(c) Replacement of stockpiled topsoil in selected areas amenable to plant growth; and

(d) Revegetating disturbed areas using native and introduced species.

PRESENT AND PROPOSED USE OF THE LAND

Historically, the project area has been used for seasonal livestock grazing and as wildlife habitat. Human use of the project area for activities, such as camping, hiking, sightseeing, and hunting, has been minimal to date in part because of the availability of other areas in southeastern Utah for these activities.

Limited livestock grazing and wildlife habitat will probably continue to be the principal uses of the affected area after termination and closure of the project. Agricultural use of the area, for either crop or hay production, is not anticipated due to the poor soil structure and scarcity of water. There are presently no urban or industrial developments in the project area other than the facilities related to the project; and none are currently planned for the future.

The purpose of the reclamation program is to restore those lands disturbed by project activities (except the tailings impoundment area) to an acceptable condition for limited livestock grazing and as a wildlife habitat. Since the existing vegetation is generally sparse and is dominated by widely spaced shrubs and by relatively few grasses that produce useful amounts of forage, successful reclamation in the project area will result in the establishment of sparse vegetation with generally low forage production.

LANDS DISTURBED FOR ORE PROCESSING FACILITY

Approximately 18 acres (7.28 ha) were leveled for construction of the plant office, ore stockpile pads, plant buildings, and auxiliary structures. After topsoil removal and stockpiling, approximately 90% of the area was graded to develop a smooth, nearly level surface. Topsoil stockpiling and stabilization have been accomplished. The surface gradient for runoff is sloped toward the tailings impoundment area. Filling was required over the balance of the graded area. Typically, cuts ranged from zero to about 15 feet (4.57 m) in depth except in localized areas (such as the ore dump pocket and connecting conveyor tunnel) where excavation was as deep as 45 feet. Maximum fill depth was approximately 40 feet at the southwest corner of the ore storage pad.

At project termination all plant structures and facilities will be leveled, and uncontaminated portions will be used to fill depressions within the plant area, such as the excavation for the ore dump pocket. All depressions within the plant site will be filled and the general surface gradient of the graded area will be maintained so all runoff from the area will continue to flow to the tailings impoundment area. Heavy equipment will be used to recontour the site to blend with the natural surrounding topography. Topsoil will be added where practical to help establish natural vegetation. Fertilization, if needed, and seeding will follow seedbed preparation to promote the establishment of vegetation in accordance with the Utah Mined Land Reclamation Act. Mulch will be used where

necessary. Existing fences will remain standing until revegetation is successful. Plant species to be seeded are likely to include: sagebrush (Artemisia spp.), Indian ricegrass (Oryzopsis hymenoides), Mormon tea (Ephedra spp.), galleta (Hilaria jamesii), Siberian or crested wheatgrass (Agropyron sibiricum or A. desertorum), Salina wildrye (Elymus salinas), saltbushes (Atriplex spp.), blackbrush (Coleogyne ramosissima), Apacheplume (Fallugia paradoxa), and/or desert bitterbrush (Purshia glandulosa), and rabbitbrush (Chrysothamnus spp.).

An area adjacent to the plant site was cleared and graded for use as a construction equipment and materials storage yard. At closure, the construction yard will be closed, all equipment will be removed, the area will be regraded to conform with the general topography of its surroundings, and disturbed areas will be seeded.

TAILINGS IMPOUNDMENT AREA

A staged covering and reclamation of the tailings impoundment area will be used to minimize radon and tailings dust emissions during operation. This tailings management technique consists of dividing the whole impoundment area into three sections. Each section represents a storage area for tailings during select time periods when the mill is operational.

Section I involves a total storage area of approximately 25 acres (10.16 ha) and will last for about four years of operation. This area of the impoundment will contain five

tailings collection cells, each having an underdrainage system of perforated pipes. Operational procedure will dictate the number of the cells used at any one time. After the tailings in any cell have reached a predetermined elevation, the cell will be deactivated. The tailings will be allowed to dry sufficiently to allow the movement of equipment on the tailings. Then the cell will be stabilized.

Construction of tailings impoundment cells in Section II of the impoundment area (south of the present cross-valley berm) will begin before all cells in Section I are filled. Thus, when all cells in Section I are filled, the tailings will be placed into the Section II cell(s) without any interruption of plant operations. There are 25 acres in the Section I impoundment, and the berm face would cover approximately four acres after regrading it to a 3H:1V slope. By the time tailings begin to be discharged into Section II cells, one or more of the Section I cells would have been stabilized so the surface area of exposed tailings will not exceed the area covered by surety.

When the last of the Section II cells are being filled with the tailings after approximately four to five additional years of operations, the dam will be raised to Stage II height (approximately 120 feet (36.58m) high), and cells will be constructed for Section III. Tailings will then be discharged into the Section III cells while the most recently used cell or cells in Section II are drying and being stabilized. The surface area of uncapped tailings will not exceed the area covered by surety.

This operational philosophy would leave a very small area to be reclaimed at the final closure of the processing facility. After the final stage of the operation, the maximum area left for reclamation will be about 25 percent of the 25-acre (10.16 ha) area of the six cells. Operational experience obtained in the design and construction of Section I will be used in the design and construction of subsequent sections.

At project termination, the tailings dam will be approximately 120 feet (36.58m) high, and will have a maximum base width of about 500 feet. The crest of the dam will extend about 13 feet (3.96m) above the level of the tailings against the dam face. Reclamation of the tailings impoundment will be accomplished by capping the remaining open cells, namely those not capped during plant operation. Each cell will be covered with approximately 6 feet (1.8m) of compacted clay to control radon emissions to the atmosphere, 2 feet (0.6m) of locally available sandy soils and 1 foot (0.3m) of gravel and cobbles to protect the cover from erosion.

After reclamation, two spillways will be constructed to protect the dam and tailings cap against erosion and flood flows. To provide for the long term stability of the tailings containment system, water flowing across the face of the dam will be minimized. One spillway will be excavated in the sandstone of the left (east) abutment of the dam to direct drainage to the downstream portion of the impoundment basin. The other spillway will be excavated in the sandstone formation along the northwest corner of the impoundment. This spillway

would divert drainage to Lost Springs Wash. Both spillways will have crest elevations three feet (0.9m) above the level of the cap and will be sized to pass the maximum probable flood. However, until sediment deposition fills in the impoundment to the level of the spillway crests, spillway flows will be rare events.

Continuous accretion of the cap is anticipated due to retention of sediments carried onto the cap by runoff from the small tributary watershed of the basin until a dynamic equilibrium between erosion and sedimentation occurs. Water flowing onto the cap will seep down through its upper layers onto the clay layer. This will tend to maintain the clay's moisture content at near saturation, and enhance the cap's effectiveness as a barrier to the movement of radon gas emanating from the tailings. The massive bluff west of the impoundment provides a windbreak that is expected to cause a net deposition of windborne soil onto the cap, adding to its thickness.

Should reclamation be required due to unforeseen circumstances prior to the end of the useful life of the processing facility, any tailings impoundment area not reclaimed during operations will be covered with the clay, sand, and gravel cap as described above. The cap will extend beyond the outer limits of the tailings to ensure complete coverage of the tailings to minimize radon emanation. The downstream face of the cross-valley berm will be sloped to a stable configuration (3H:1V slope) and the cap will be extended to cover the face to protect it from erosion.

Given the scenario of the processing facility's shutdown after only one or two cells are partially or completely filled, reclamation would proceed in much the same manner as discussed previously, but additional earthwork will be required. The exposed sides of the dikes between the used and unused cells will be reshaped to lessen their slope, and then they would be reclaimed by continuing the cap over them.

There are two basic configurations that the covered tailings impoundment could have if this scenario should happen. If cells 1, 2 and 3 were used, the cap will be extended (at an approximately level grade) to the north to disallow impoundment of runoff behind the cells. The extension of the cap that would be constructed with the purpose of bringing the low areas up to grade will not necessarily be constructed in the same manner as the portions of the cap that cover tailings. The cap extension will be constructed of locally available fill materials and will be covered with cobble or gravel to prevent erosion.

The second basic configuration would occur if a combination of cells 1, 2 and 5; or 1, 3 and 4 were used. Either of these combinations could also lead to a situation in which runoff water would be impounded. To prevent impounding water, the berms will be shaped and capped as described previously. The cross-valley berm will be breached (where it was not containing the tailings), and a riprapped diversion channel will be built outside of the tailings cap perimeter. Construction of the channel will prevent runoff from eroding the cap

and will divert water through the breached part of the cross-valley berm.

The above two configurations will cost significantly less than the surety posted for the impoundment area. Both will entail relatively small expenditures for engineering, fill materials, and haulage. Cost of constructing a riprapped diversion channel and breaching the cross-valley berm will be significantly less than constructing a level cap to preclude water impoundments.

As stated in Section 3.3.2.1 of NUREG-0583 (FES for the Shootaring Canyon Uranium Project; July 1979) and Section 9.4 of the Environmental Report, Shootaring Canyon Uranium Project, Garfield County, Utah, locally available materials will be used to construct the impoundment cap. Bentonitic clay from the Brushy Basin Member of the Morrison Formation will be compacted to form the 6-foot (1.8m) layer. This clay will be obtained from the same borrow area ("Ga") as the clay used for the impoundment liner. Borrow Area "Ga" is located on Bureau of Land Management (BLM) controlled land and is covered by a materials sale contract (U-45859) with Plateau. Reclamation and surface protection requirements for this borrow area are stipulated in the contract, and the BLM holds a performance bond as surety.

The 2-foot (0.6m) layer of sandy material will be obtained from Borrow Area E. This material is a red, fine sand, with silt varying from a trace to a significant percentage. Borrow Area E is located west of the processing

facility. Material will be removed from this borrow area in a sequential stripping operation so very little, if any, recontouring will be required. Much of the area will be stripped to bedrock and the remaining parts of it will be reseeded.

Borrow Areas A, A', or C will be the source of the gravel, cobble, sand layer that will protect the cap from erosion. Test pit logs for these areas describe the materials as hard, sub-rounded to sub-angular cobbles and gravel, and sand with calcareous cement. Material from these areas was used during construction of the processing facility under material sales contract U-44547 with the BLM. The BLM requires a surety bond of twenty percent of the contract amount for this type of sale to cover reclamation costs.

(2735s)

TABLE 5.5-6 *

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES [a]	AVERAGE [b c f]	MAXIMUM [b d f]	REMOVABLE [b e f]
U-nat, U-235, U-238, and associated decay products	5,000 dpm alpha/100 cm^2	15,000 dpm alpha/100 cm^2	1,000 dpm alpha/100 cm^2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/100 cm^2	3,000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emissions or spontaneous fission) except SR-90 and others noted above	5,000 dpm beta-gamma/100 cm^2	15,000 dpm beta-gamma/100 cm^2	1,000 dpm beta-gamma/100 cm^2

[a] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d] The maximum contamination level applies to an area of not more than 100 cm^2.